



Claims

11. (New) An exothermal feeder composition comprising aluminum, magnesium, at least one oxidizing agent, a SiO_2 -containing filler and an alkali silicate as a binder, wherein the composition further comprises about 2.5 to about 20 percent by weight of an aluminum oxide with a specific surface area of at least about $0.5 \text{ m}^2/\text{g}$ and an average particle diameter (d_{50}) from about 0.5 to about 8 microns, and wherein the composition has a content of fluoride comprising less than about 1.0 percent by weight.

12. (New) The feeder composition of Claim 11 wherein the aluminum oxide has a specific surface area of about 1 to about $10 \text{ m}^2/\text{g}$.

13. (New) An exothermal feeder composition comprising about 20 to about 35 percent by weight aluminum, about 1.5 to about 10 percent by weight magnesium, about 8 to about 20 percent by weight of an oxidizing agent, about 4 to about 18 percent by weight of an aluminum oxide, about 8 to about 22 percent by weight of an alkali silicate and about 58.5 to about 17 percent by weight of a temperature resistant SiO_2 -containing filler.

14. (New) The feeder composition of Claim 13 wherein the aluminum comprises from about 22 to about 28 percent by weight.

15. (New) The feeder composition of Claim 13 wherein the magnesium comprises from about 2 to about 7 percent by weight.

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16. (New) The feeder composition of Claim 13 wherein the oxidizing agent comprises about 10 to about 15 percent by weight.

17. (New) The feeder composition of Claim 13 wherein the aluminum oxide comprises about 8 to about 13 percent by weight.

18. (New) The feeder composition of Claim 13 wherein the alkali silicate comprises from about 10 to about 13 percent by weight.

19. (New) The feeder composition of Claim 13 wherein the alkali silicate comprises from about 17 to about 22 percent by weight.

20. (New) The feeder composition of Claim 13 wherein the temperature-resistant SiO_2 -containing filler comprises from about 43 to about 29 percent by weight.

21. (New) The feeder composition of Claim 11 wherein the oxidizing agent comprises iron oxide.

22. (New) The feeder composition of Claim 13 wherein the oxidizing agent comprises iron oxide.

23. (New) The feeder composition of Claim 11 wherein the oxidizing agent comprises an alkali nitrate.

24. (New) The feeder composition of Claim 13 wherein the oxidizing agent comprises an alkali nitrate.

25. (New) The feeder composition of Claim 11 wherein the SiO_2 -containing filler has a SiO_2 content of at least about 50 percent by weight.

26. (New) The feeder composition of Claim 13 wherein the temperature resistant SiO_2 -containing filler has a SiO_2 content of at least about 50 percent by weight.

27. (New) The feeder composition of Claim 11 wherein the SiO_2 -containing filler has a SiO_2 content of at least about 60 percent by weight.

28. (New) The feeder composition of Claim 13 wherein the temperature resistant SiO_2 -containing filler has a SiO_2 content of at least about 60 percent by weight.

29. (New) The feeder composition of Claim 11 wherein the SiO_2 -containing filler is comprised of a material selected from the group consisting of quartz, sand, aluminum silicates and combinations thereof.

30. (New) The feeder composition of Claim 13 wherein the temperature resistant SiO_2 -containing filler is comprised of a material selected from the group consisting of quartz, sand, aluminum silicates and combinations thereof.

31. (New) The feeder composition of Claim 13 wherein the temperature resistant SiO_2 -containing filler is formed in a shape selected from the group consisting of hollow microspheres, ground chamotte, mineral fibers and combinations thereof.

32. (New) The feeder composition of Claim 11 wherein the properties of the aluminum oxide comprise the following:

an Al_2O_3 content greater than about 90 percent,

a content of OH-groups up to about 5 percent,

a specific surface area (BET) from about 1 to about 10 m²/g, and

an average particle diameter (d_{50}) from about 0.5 to about 15 microns.

33. (New) The feeder composition of Claim 13 wherein the properties of the reactive aluminum oxide comprise the following:

an Al₂O₃ content greater than about 90 percent,

a content of OH-groups up to about 5 percent,

a specific surface area (BET) from about 1 to about 10 m²/g, and

an average particle diameter (d_{50}) from about 0.5 to about 15 microns.

34. (New) A process for reducing hollow fire in a feeder composition containing less than about 1.0 percent by weight fluoride comprising preparing the feeder composition utilizing the compositions of Claim 11.

35. (New) A process for reducing hollow fire in a feeder composition containing less than about 1.0 percent by weight fluoride comprising preparing the feeder composition utilizing the compositions of Claim 13.

36. (New) A process for preventing graphite degeneration in a feeder neck area and in an area which extends into a feeder composition comprising casting the feeder composition using the composition of Claim 11.

37. (New) A process for preventing graphite degeneration in

a feeder neck area and in an area which extends into a feeder composition comprising casting the feeder composition using the composition of Claim 13.

Exhibit D
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